US-PAT-NO: 4718905

DOCUMENT-IDENTIFIER: US 4718905 A

TITLE: Haptic element using ion beam implantation for an intraocular lens

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Brief Summary Text - BSTX (21):
Another intraocular lens available today is a PMMA lens body with haptics comprised of PMMA loop material. While these PMMA loops provide an excellent ocular **prosthesis,** the PMMA material is stiffer than polypropylene and can be quite difficult to remove when necessary. Additionally, some patients believe they can feel the pressure of PMMA loop material in an eye. This is especially prominent when a patient has a polypropylene loop intraocular lens in one eye, showing no discomfort, and reports a kind of "pressure feeling" in the other eye where an all PMMA loop intraocular lens resides.

Brief Summary Text - BSTX (29):
Nitrogen implantation is the process most heavily researched and easiest to perform and it was one of the first commercial applications for ion-beam implantation. Generally, the nitrogen ions emerge from an ionization chamber as part of a 50-50 mixture of ions and charged molecules. The nitrogen ions make the material or substrate more durable, reduce surface flaws and minimize other defects, and prevent spalling (peeling away of the surface layer) and other types degradation. One example is nitrogen treatment of surgical bone

implants. In many such **prostheses,** this treatment reduces wear rates by a faction of 400 or more. Implants have also been treated with carbon with good results. The surface wear has been reduced to negligible levels and greatly extends the useful life of the implant.

Drawing Description Text - DRTX (10):

FIG. 8 is a cross-sectional view similar to FIG. 6 showing another embodiment in which a small **undercut** on the apical surface of the haptic strand receives the covering.

Detailed Description Text - DETX (2):

Before presenting a detailed description of the subject intraocular lens device, it may be worthwhile to briefly outline the context of the instant invention. In this connection, FIG. 1 depicts the use of a surgically implantable intraocular lens **prosthesis** which may advantageously employ the biocompatible protective coating of the subject invention.

Detailed Description Text - DETX (28):

Ion-beam processing is a "**line**-of-**sight**" process, the workpiece must be moved about in a steady, controlled manner during exposure for a uniform bombardment. And because implantation occurs in a vacuum, bombarded materials are not subject to convective cooling; temperatures can rise high enough to damage some materials. Obviously, the processing conditions including temperature must be such that the haptic or intraocular lens are not damaged during the process. Thus, the temperature must be suitable for the material or substrate being treated.

Detailed Description Text - DETX (33):

In the ion beam sputtering process, an energetic ion beam is incident on the target substrate and causes sputtering of the target ions which then coat the substrate of interest. In this process, the sputtered atoms arrive at the substrate surface with enough energy to cause ionization and to **deposit a coating** film with good adhesion qualities. The **coatings deposited** in this process are under compression and manifest a dense amorphous structure. **Thin films** of virtually any compound can be **deposited** by this technique.

Detailed Description Text - DETX (42):

An alternate embodiment of the invention is shown in FIG. 5 wherein a covering 42 extends partially around the circumference of a polypropylene core 32 of a haptic strand. A cross section of the loop is presented in FIG. 6 and discloses the cover 42 attached as a veneer onto an outer apical surface 44 of the haptic. Here the cover 42 is advantageously provided with a feathered edge 48 as it terminates at about diametrically opposite points on the apical surface 44, so as to appear as a smooth continuous surface around the circumference of the haptic element. Alternatively, a small **undercut** 42' may be employed on the apical surface of the haptic element to receive the coating. In this embodiment, the weight of the biocompatible protective covering material is reduced with respect to the positively buoyant polypropylene.

Claims Text - CLTX (13):

13. An intraocular lens as defined in claim 1, wherein said haptic element has a small **undercut** on the apical surface to receive the biocompatible protective ion coating.